ABSTRACT OF THE DISCLOSURE

A method of manufacturing a hybrid tool which serves both as a form on which constituent materials are applied for bonding or curing into a part in a desired configuration, and for holding the bonded or cured materials in the originally applied position during subsequent machining of a peripheral edge of the part by a CNC machine tool while the lay-up tool is positioned on a bed of the machine tool includes fabricating a face sheet of composite material having a facing surface configured to the reverse of a desired shape of one surface of a part to be made on the tool, the tool body having a reference plane whose orientation and height above the machine tool bed are specified in the part program. A substantially continuous ~~grove~~ groove in the face sheet of the hybrid tool opens in the facing surface. A base structure supports the face sheet to maintain the facing surface in the desired shape. The base structure has ground-engaging pads, each having a contact surface, together defining an "A" datum plane, by which the supporting structure contacts and is supported by the machine tool bed. Attachments on the tool body support the face sheet on the supporting structure with the reference plane of the face sheet parallel to the "A" datum plane. The materials for the part are applied on the face sheet, are bonded or cured, and edge trimmed thereon, all while on the face sheet in the originally applied position. The edge trimming is performed by a CNC machine tool following a part program to move a cutter extending into the groove to engage the full thickness of the part. The groove corresponds in space to the position represented by the cutter path of travel in the part program by virtue of accurate relationship of the face sheet reference plane and the "A" datum plane; for making laid-up, bonded and cured composite parts, includes filling a groove on a facing surface of a tool with a foaming, self-skinning sacrificial material and covering the facing surface of the tool with a caul sheet. The tool is heated to cure the foaming material, filling the groove and forming a hard, smooth surface skin on the foam, flush with the facing surface of the tool. A series of plies are

laid-up on the facing surface of the tool to form a tool-side skin, and other components of the part are laid-up on top of the tool-side skin plies. An adhesive/resin matrix is coated on or pre-impregnated into the skin plies and the components for bonding/curing to create a rigid integral assembly of the skin and components. A vacuum bag is applied over the laid-up skin and components and is sealed to peripheral regions of the facing surface of the tool around the laid-up skin and components. Air is evacuated from under the vacuum bag to cause air pressure outside the vacuum bag to press the vacuum bag against the components. The adhesive/resin matrix is bonded/cured to transform the skin and components into the rigid integral assembly. The vacuum bag is removed from the facing surface of the tool, uncovering the rigid integral assembly. The tool is fixed in a known position on a CNC machine tool bed to position the facing surface of the tool at a known position for edge routing of the rigid integral assembly by a machine tool. A cutter of the machine tool is guided on a predetermined path around the facing surface of the tool, with the cutter extending into the groove below the facing surface of the tool and cutting a peripheral edge around the rigid integral assembly. After edge routing, the rigid integral assembly is a finished part and is removed from the facing surface of the tool.